



## **Modulagem de contaminação cruzada: teoria e aplicação**

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# Modulagem de contaminação cruzada: teoria e aplicação

Cleide Oliveira de Almeida Møller

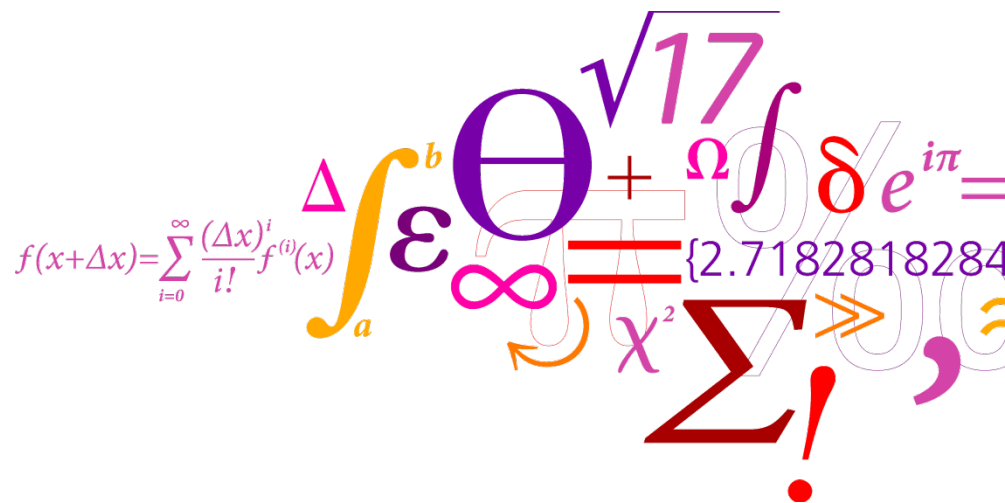
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# Outline:

- Modelagem de contaminação cruzada
  - ✓ Introdução
  - ✓ Objetivos do estudo
  - ✓ Resumo do trabalho desenvolvido
  - ✓ Processo para construir o modelo
  - ✓ Resultados
  - ✓ Desafios e perspectivas
- Projeto Brasil-Dinamarca
- Aplicação

# Modelling transfer of *Salmonella*

## Typhimurium DT104 during grinding of pork

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2 Department of Food Science, Faculty of Life Sciences, University of Copenhagen, Copenhagen, DK.

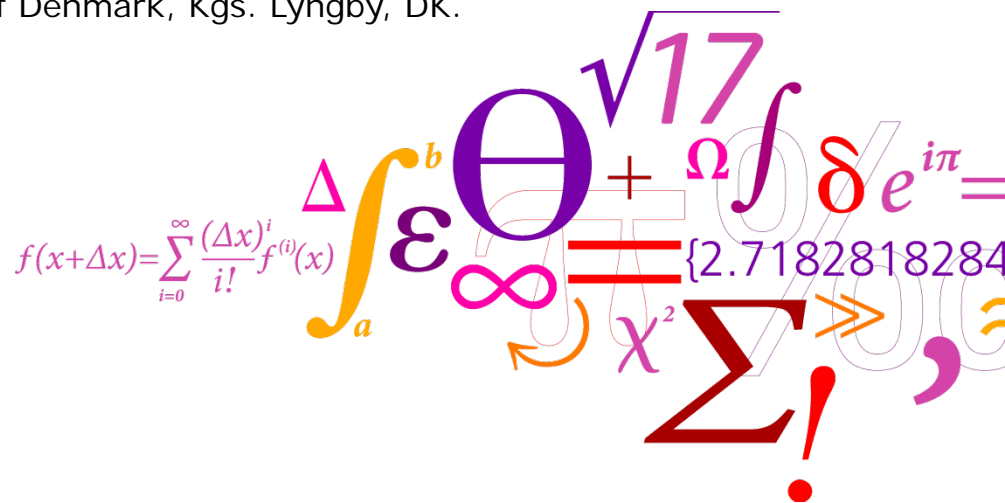
3 National Food Institute, Technical University of Denmark, Kgs. Lyngby, DK.

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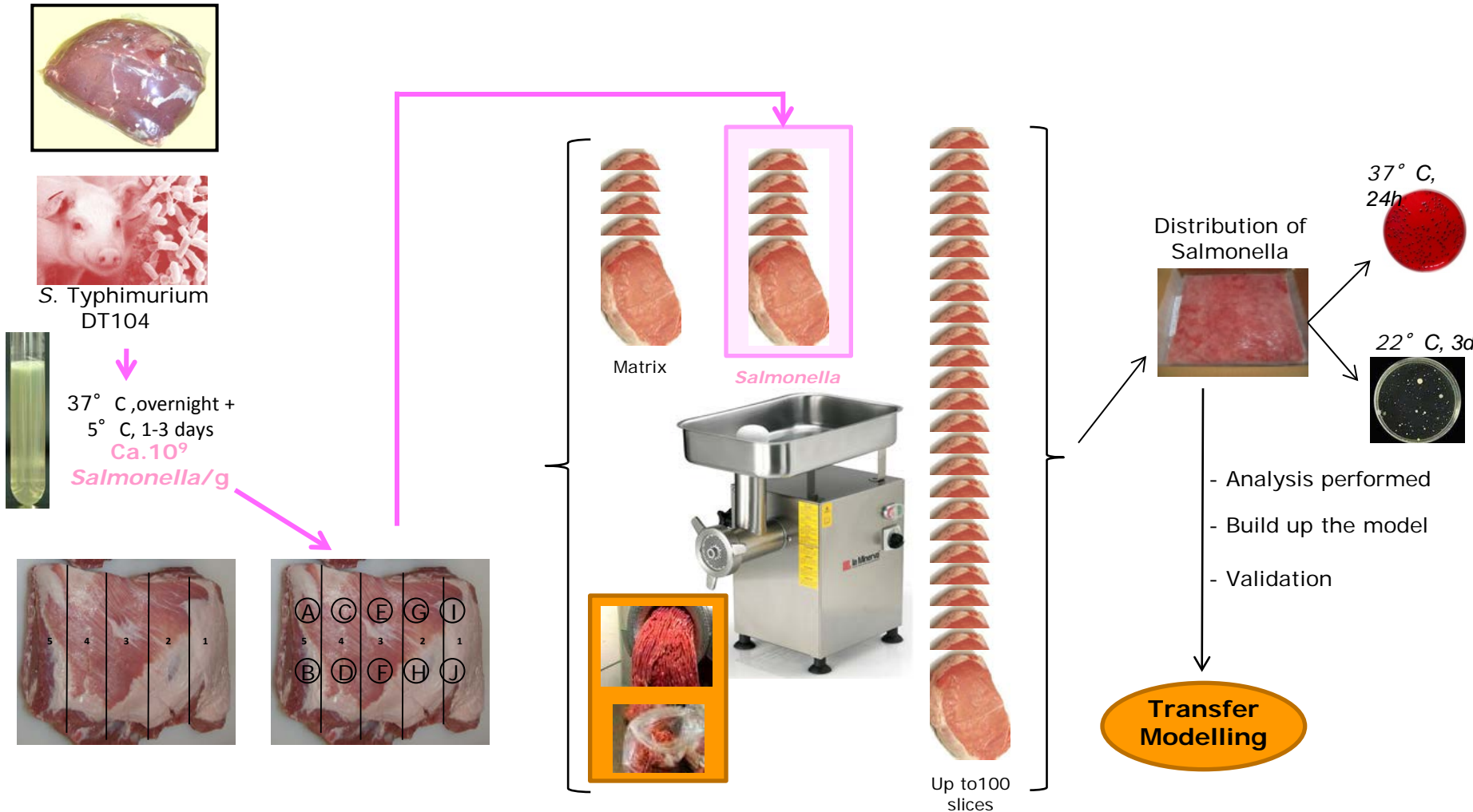
# Introduction

- *Salmonella* is a critical pathogen (CDC, 2011; EFSA, 2010).
- Pork still is an important source of salmonellosis (EFSA, 2010; van Hoek *et al.*, 2012; Wegener *et al.*, 2003).
- Ground meat is frequently associated with outbreaks of salmonellosis (Stock and Stolle, 2001).
- Up to 70% of foodborne illnesses are estimated to be linked to catered food (Filion and Powell, 2011; Hensen *et al.*, 2006; Jones *et al.*, 2004; Lee and Middleton, 2003).
- In Denmark, 61 of 86 reported outbreaks in 2011 were associated with outside-the-home settings (anonymous, 2012).
- To model the distribution of pathogens during the processing operation are of major relevance to risk analysts (Flores, 2006).

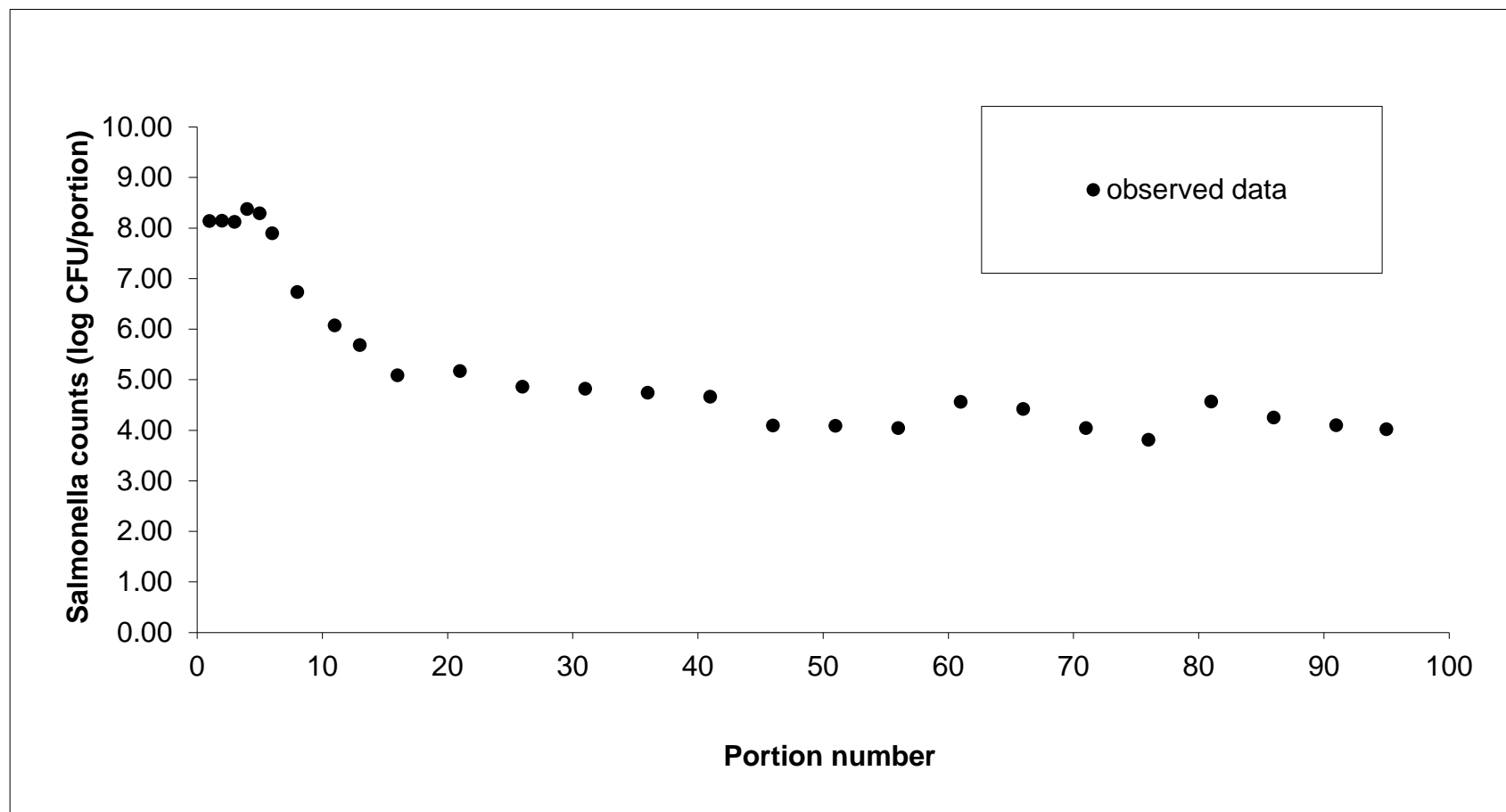
# Objective

The aim of this study was to develop a model able to predict cross contamination of *Salmonella* in pork grinding.

## Experimental work



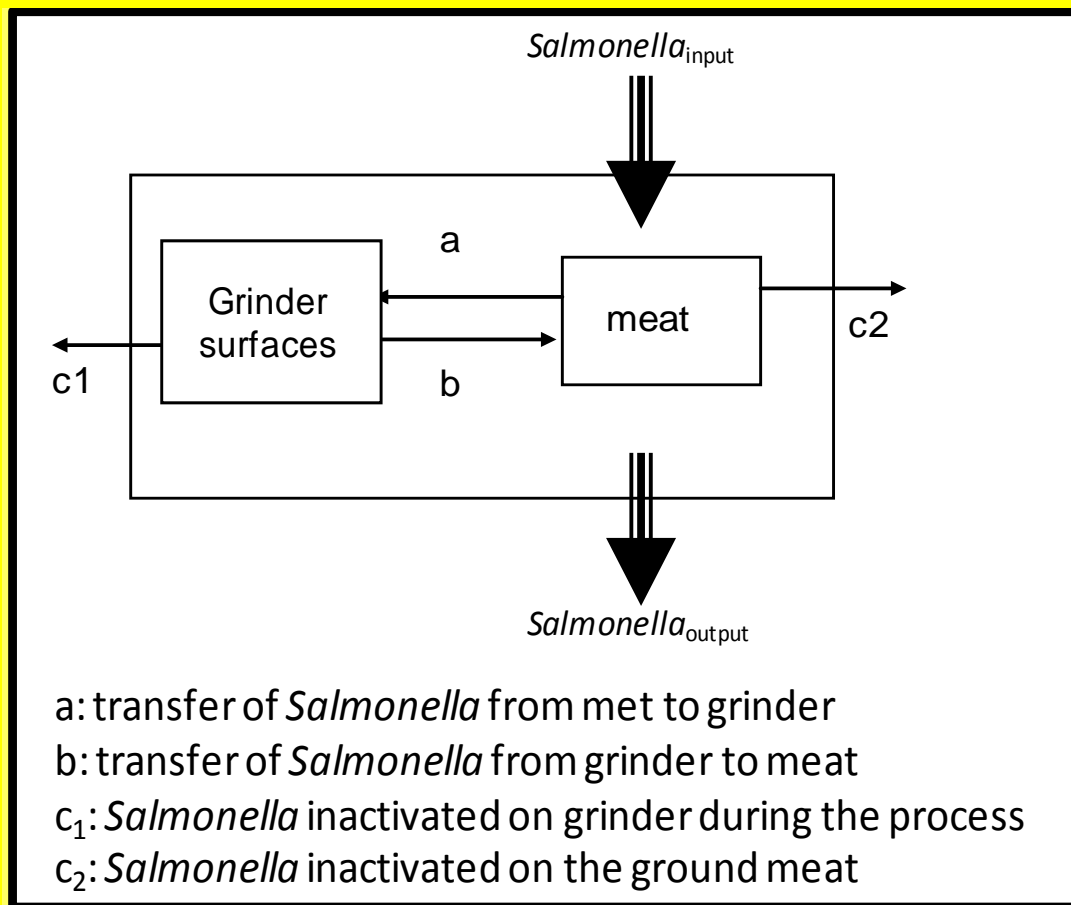
## Describing the transfer rates of *Salmonella* during pork grinding



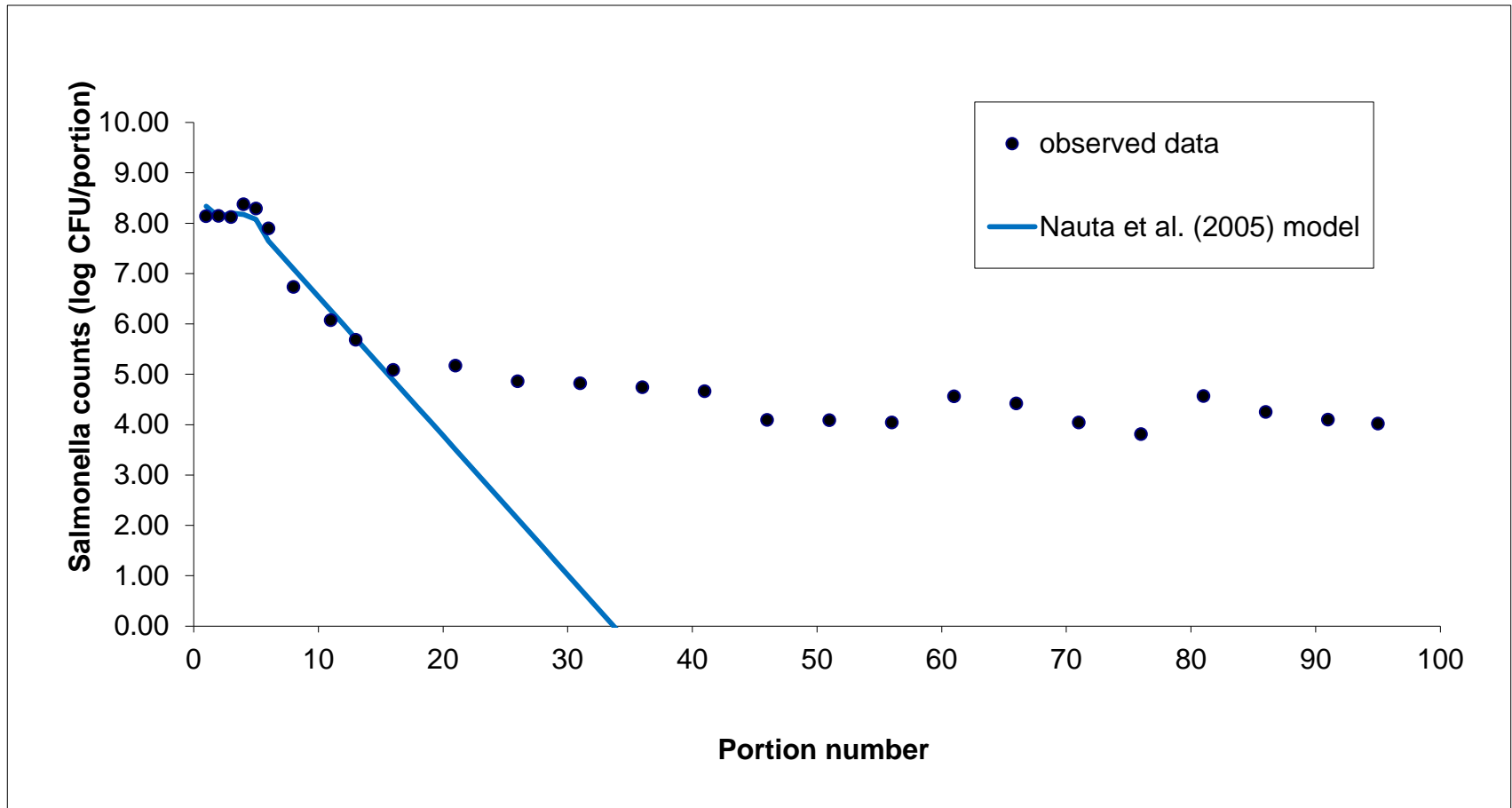


# Modelling cross-contamination during pork grinding

## Nauta et al. (2005) Model



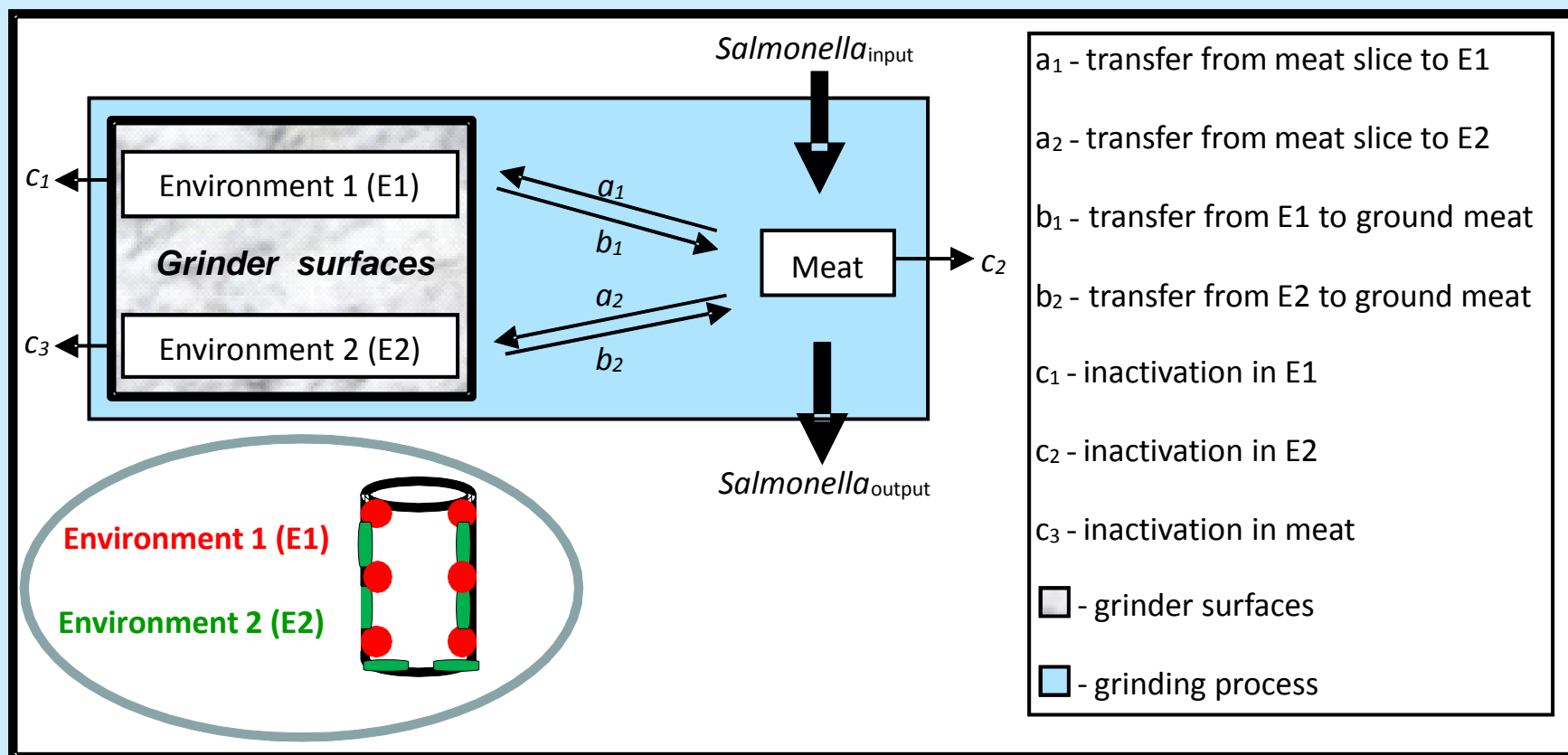
## Describing the transfer rates of *Salmonella* during pork grinding



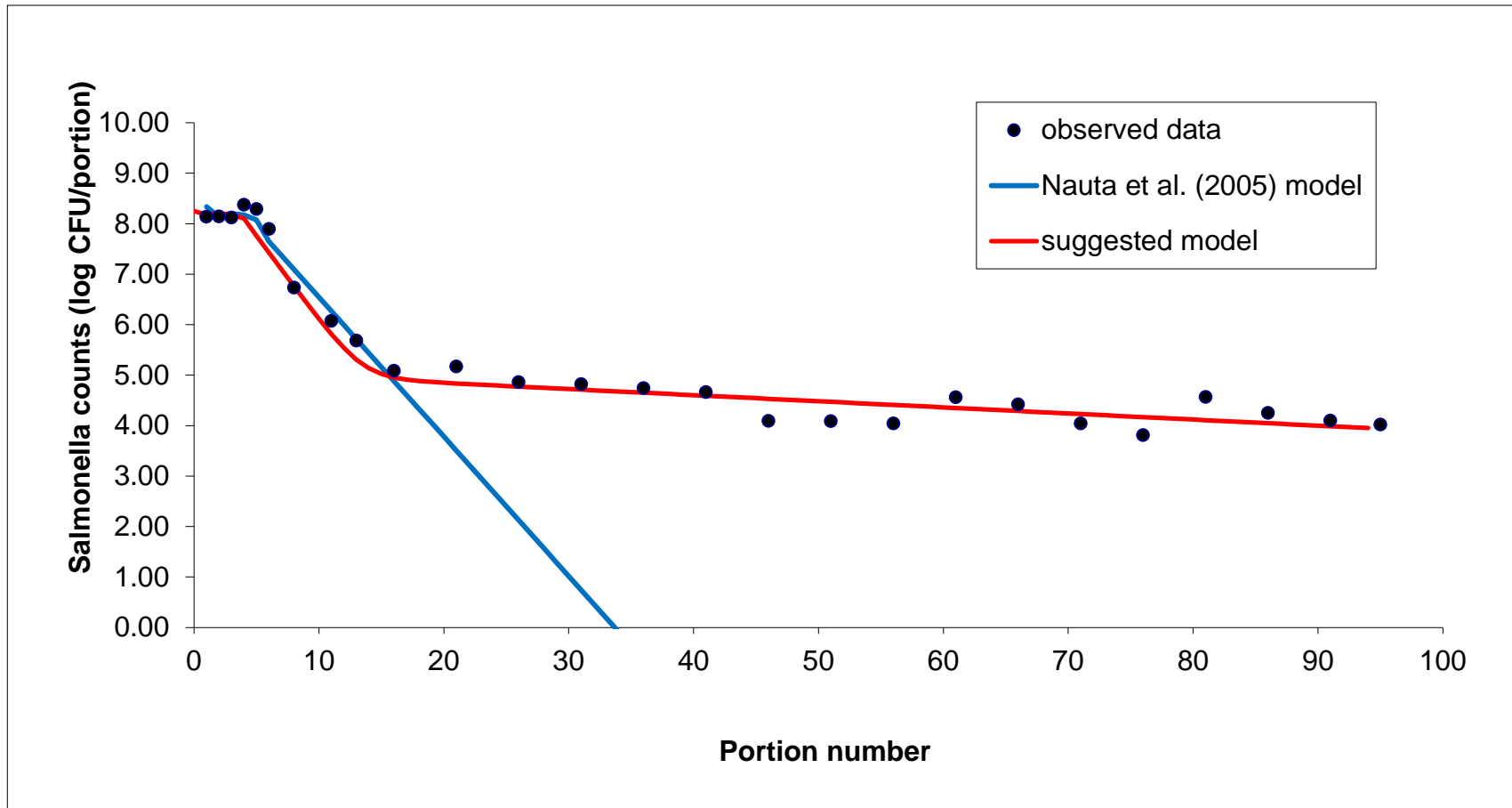
Transfer rates of *Salmonella* DT104 based on cell count data fitted to the suggested model

# Modelling cross-contamination during pork grinding

## Suggested Model

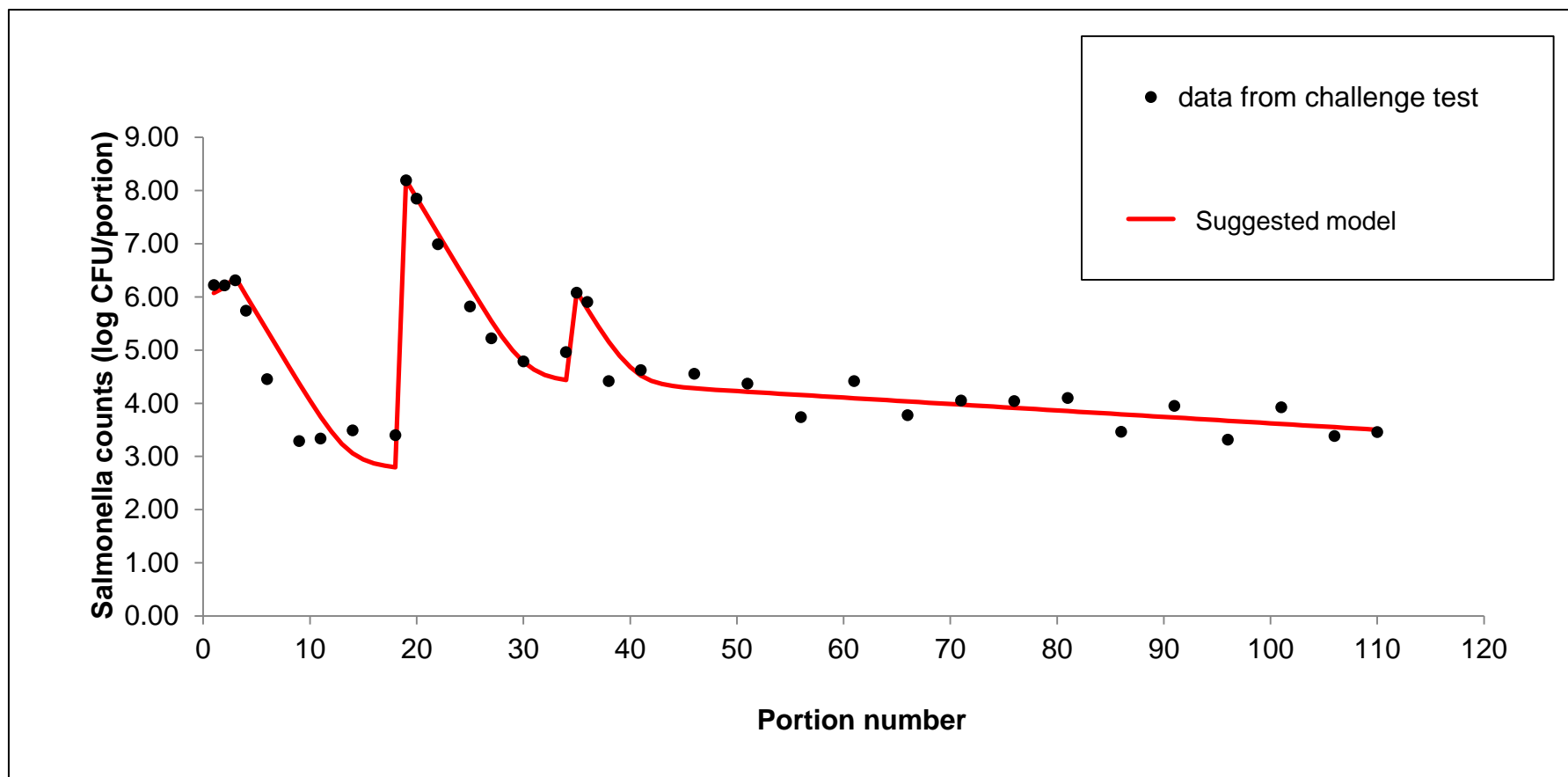


## Describing the transfer rates of *Salmonella* during pork grinding



Transfer rates of *Salmonella* DT104 based on cell count data fitted to the suggested model

# Challenges in cross-contamination during pork grinding





## **Describing the transfer rates of *different pathogens* during slicing in other matrices rather than pork using literature data:**

- when applying the data published by Vorst *et al.* (2006), simulating cross contamination of *L. monocytogens* during turkey slicing,  $R^2 = 0.86$ , was found.
- when the data presented by Aarnisalo *et al.* (2007), regarding transfer of *L. monocytogens* during slicing of gravad salmon, was used  $R^2 = 0.74$  was obtained.
- and for the data published by Sheen and Hwang (2010) related to cross contamination of *E. coli* O157:H7 during ham slicing,  $R^2$  was 0.78.

## ORIGINAL ARTICLE

### **Modelling transfer of *Salmonella* Typhimurium DT104 during simulation of grinding of pork**

C.O.A. Møller<sup>1</sup>, M.J. Nauta<sup>1</sup>, B.B. Christensen<sup>2</sup>, P. Dalgaard<sup>3</sup> and T.B. Hansen<sup>1</sup>

- Tail phenomenon
  - ✓ Food processors
    - Control measures
    - Cleaning and sanitization
- Observed transfer successfully modelled
- Model can describe different processes
- Tool to support risk assessors

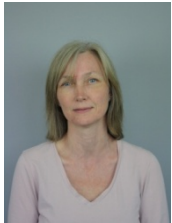
#### • To be investigated:

- ✓ Food matrices
- ✓ Pathogens
- ✓ Inoculum levels
- ✓ Processings



# Acknowledgements

- ✓ This research project was financed by the Technical University of Denmark through the FoodDTU programme
- ✓ Constructive advice and critical comments were given by:



Tina Beck Hansen



Maarten Nauta



Paw Dalgaard



Bjarke Bak Christensen



- ✓ Skillful technical assistance was provided by colleagues from the Division of Food Microbiology at the National Food Institute.



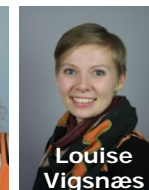
Rikke Krag



Mette Kemp

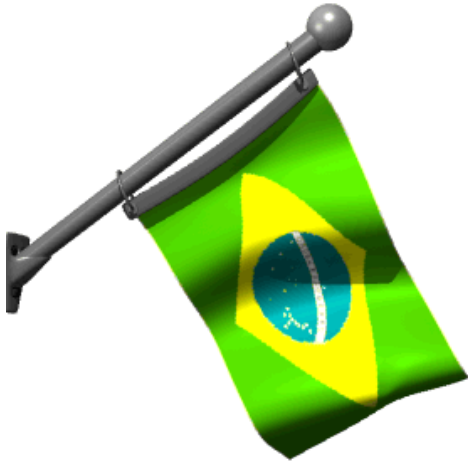


Kate Vibefeldt



Louise Vignæs





## **Meat-Cross-Con**

**MEAT SAFETY: An innovative modelling approach to evaluate microbial pathogen transfer and cross contamination from farm to fork**

# Acknowledgements



**Let's start the practical application of the cross contamination model?**



**Thanks**